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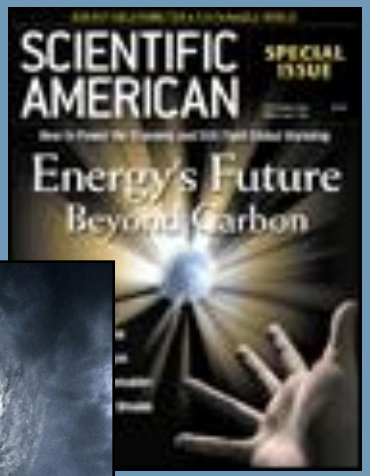
Collaboration and Partnership Through Communities of Practice

Panel discussion on collaboration and partnerships at the ESIP Winter Meeting 2012.

Kevin T. Gallagher, Associate Director, Core Science Systems, USGS

U.S. Department of the Interior
U.S. Geological Survey



USA TODAY · TUESDAY, FEBRUARY 28, 2006 · 3A

Nation

New Mexico gets taste of dry future

By Patrick O'Driscoll, USA TODAY

New Mexico got a stark glimpse this year of what the future could be if steps aren't taken to curb climate change

Some say this year's warm, parched weather is start of climate change projected for next century

go Climate Exchange, an experimental market of companies, non-profit groups and local governments that earn and trade credits for cutting greenhouse emissions.

Lots of talk, no solution to America's oil addiction

The challenge and the rebuttal have something in common: Both lack a real solution.

Last week, in his State of the Union speech, President Bush called on America to end its "addiction to oil" by weaning itself from foreign imports. This week, Stuart McGill, an Exxon Mobil vice president, offered a rebuttal in a speech at an energy conference: It won't happen.

Loren Steffy
HOUSTON CHRONICLE

"Realistically, it is simply not feasible in any time period relevant to our discussion today," McGill said, according to Reuters. "No combination of conservation measures, alternative energy sources and technological advances could realistically

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The Requirement to Be Interdisciplinary

- **The inherent complexity of nature**
- **The need to explore questions and problems that are not confined to a single discipline**
- **The need to solve societal problems**
- **The power of new technologies**

(Committee on Facilitating Interdisciplinary Research, National Academy of Sciences, 2004)

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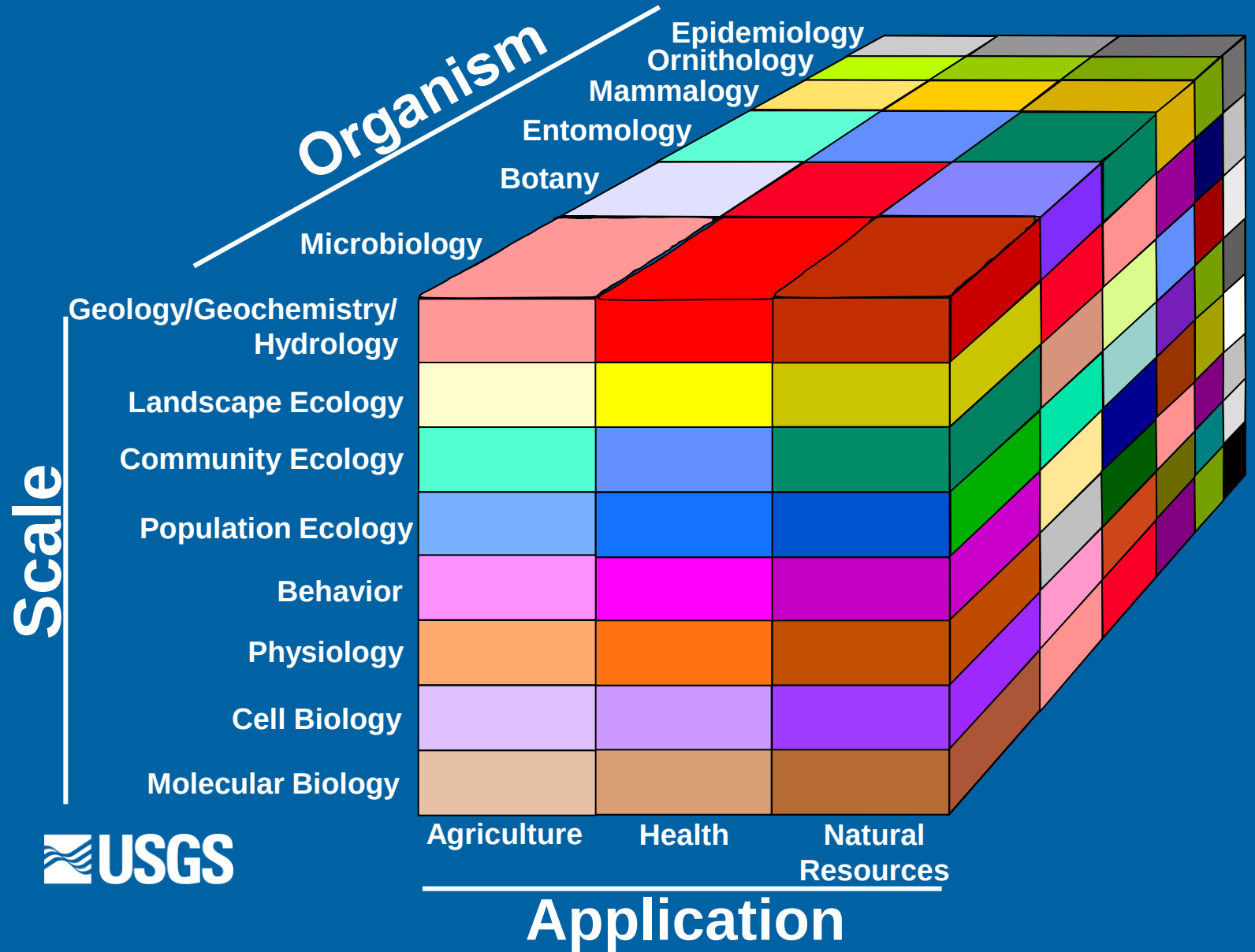
The Balkanization of Science



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A Long-Standing Challenge

“(the federal environmental research system) is poorly structured to deal with complex, interdisciplinary research on large spatial scales and long-term temporal scales.”

Carnegie Corporation Report on Federal Environmental Research and Development (1992)

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The President's Science Policy

Quotes from the Office of Science and Technology:

- **Data-Enabled Science ("Big Data") – "Improved approaches are needed to derive science and social value from the vast amount of data we are now acquiring"**

- **Research and development in such approaches as algorithms, data mining, analytics, and visualization tools should be priorities"**

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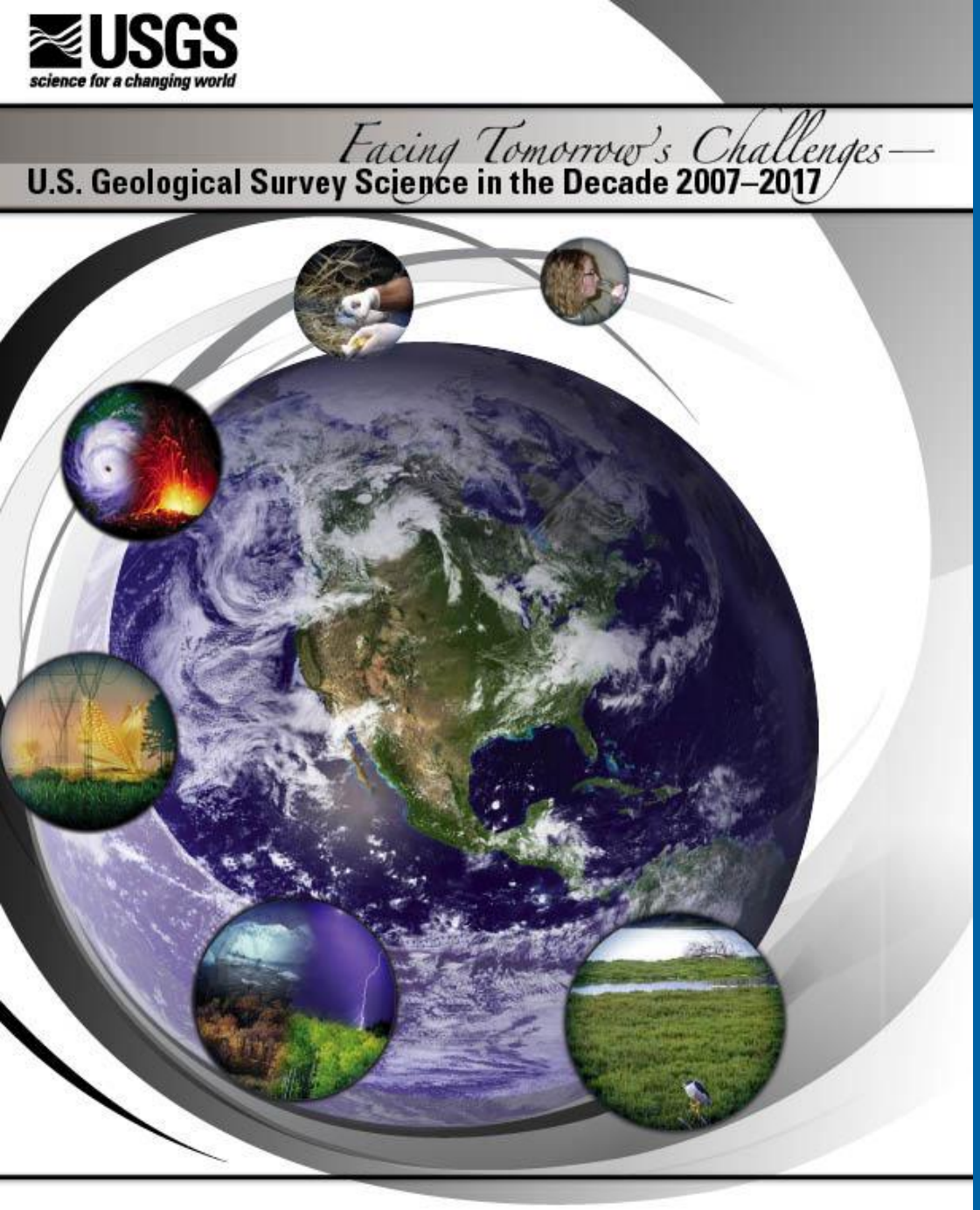
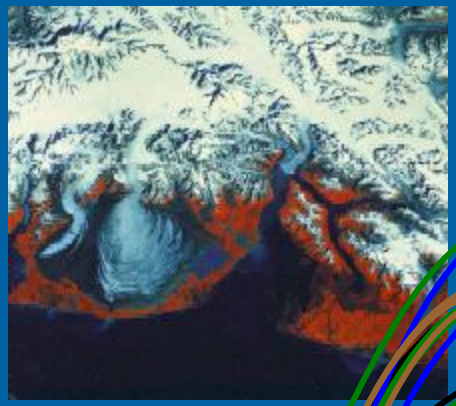


U.S. Geological Survey Goals for the Coming Decade

Formidable 21st century challenges form the backdrop for the USGS science strategy

http://pubs.usgs.gov/circ/2007/1309/

The USGS Science Strategy



Understanding Ecosystems and Implications of Change

Quantifying Role of Environment and Wildlife in Human Health

Quantifying, Forecasting, Securing Freshwater For America's Future

Science for Risk, and Resilience Assessment of Natural Hazards

Clarifying the Climate Record to Assess Consequences of Change

Science for Future Energy and Mineral Needs and Decisions

Data Integration and Beyond

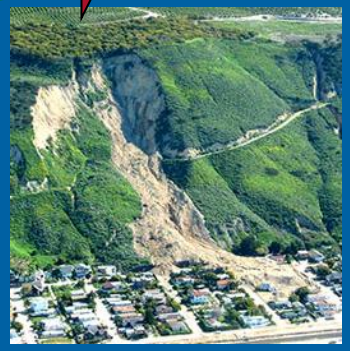
Biology

Geography

Geology

Water

GIO



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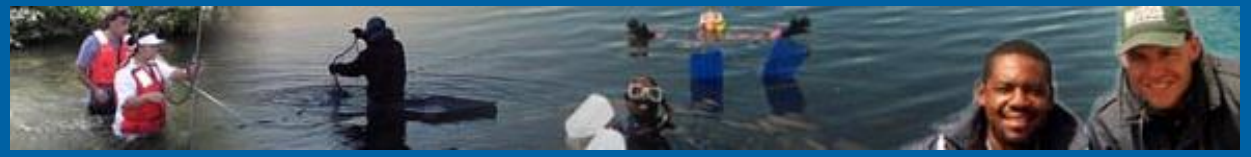

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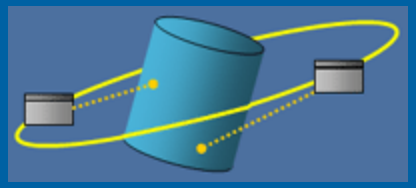
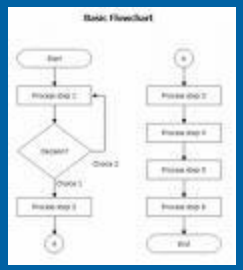
Data Integration is Key

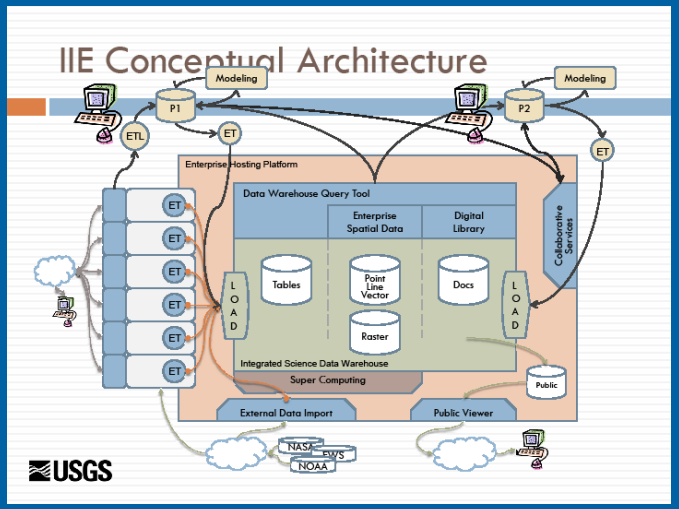
U.S. Department of the Interior
U.S. Geological Survey

Data Integration: What is it?



- It appears intangible.
  - Is it a concept?
  - A picture?
  - An Architecture?
  - A Portal?
  - Data Standards?
  - A Data Warehouse?





- Will we know it when we see it?
- How will we measure progress towards it?

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Data Integration: What is it?

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Data Integration: A Project View

Access & Discovery
- Processes & Tools for Indexing Science Content (by geographic location, science topic, and time)
- Comprehensive Science Catalog (Data, Publications, Specimens, Projects, etc.)
- Web Services
- Portals

- Standards & Tools
  - Data Loading, Metadata, and Data Exchange
- Interoperable Data
  - Integrated Data Modeling, Archiving and Retrieval
  - Data Hosting Capability
  - Extraction, Load, and Query
- Authoritative Data Sources and Data Stewards *(Data Life Cycle)*
- Applications Development
- Geospatial Data Accessibility
- Visualization Tools
- Quantitative Science Models and Analytical Modeling Tools
- Future Workforce Strategies

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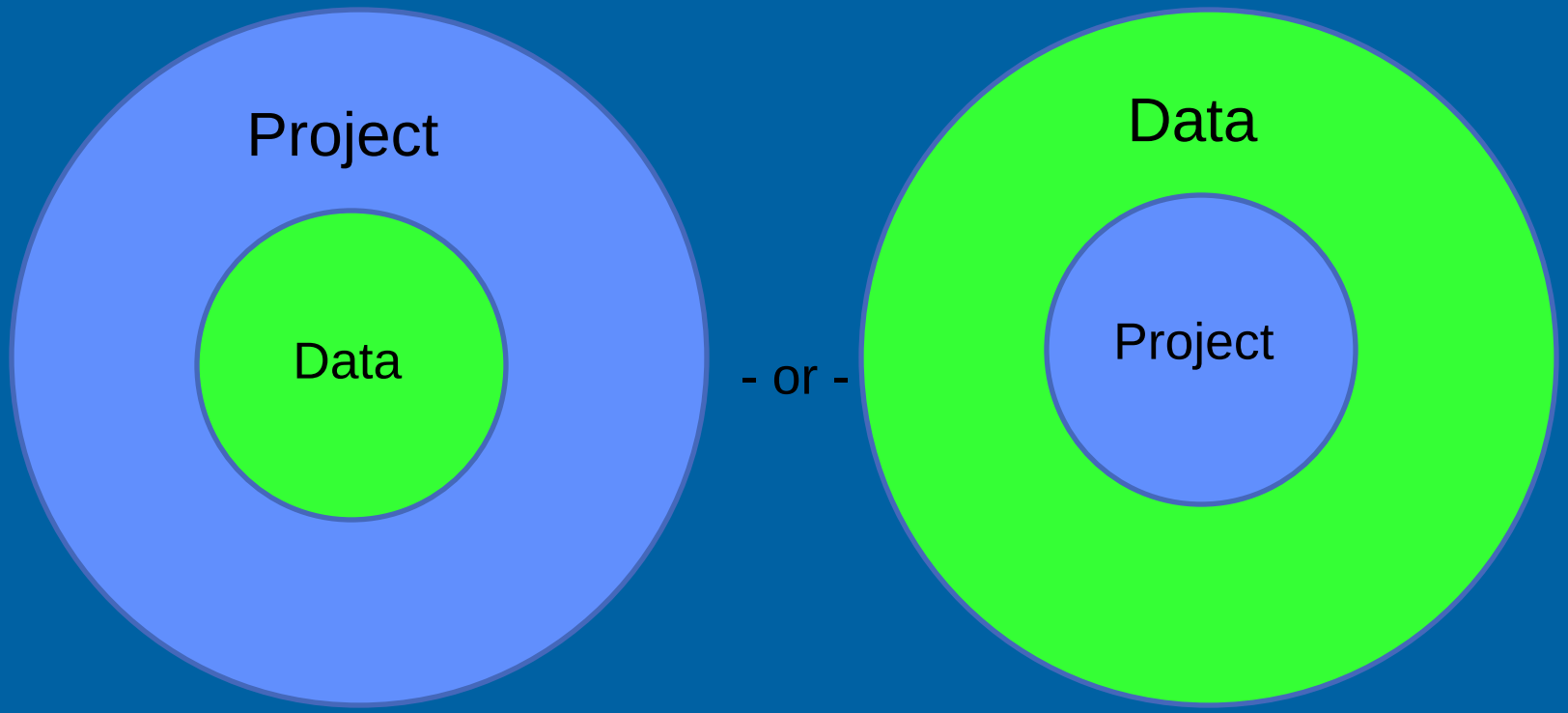
What Does Data Integration Look Like? "Eye Test"



What do you see?

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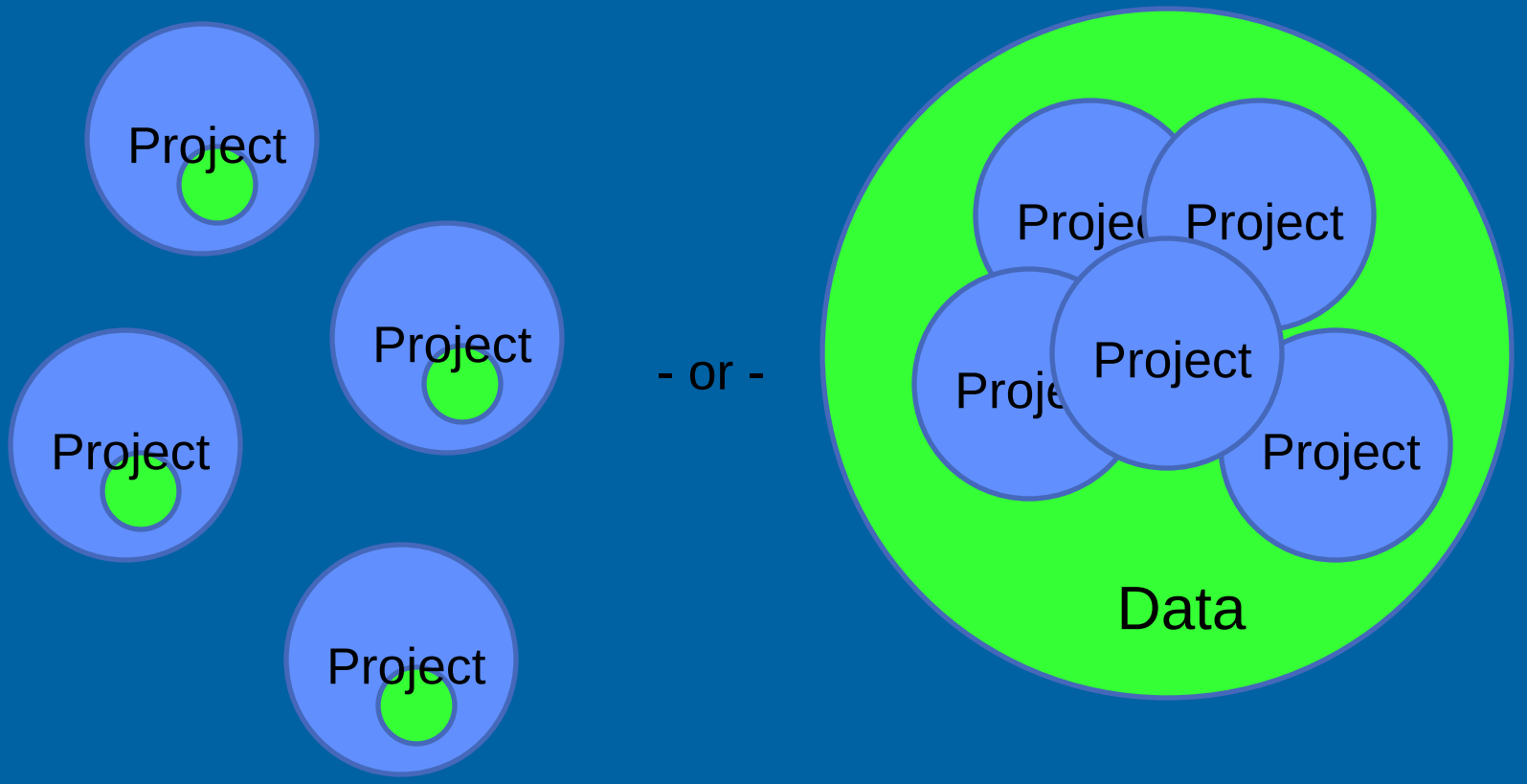
After Many Projects, What do you See?



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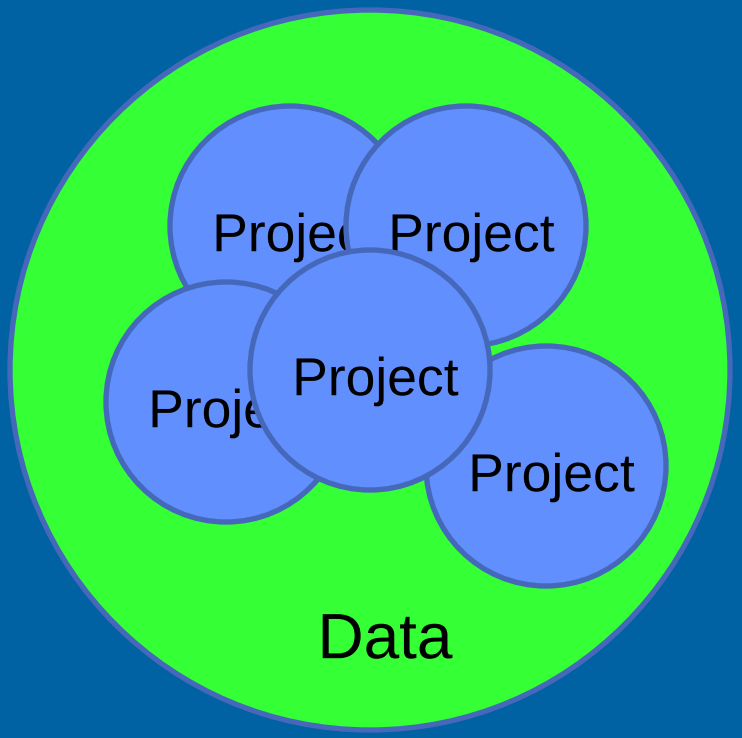
The Integrated Data View

- Many participate in the data resource
- The Data is:
  - Visible
  - Indexed and Accessible
  - Developed According to Science Planning
  - Commonly defined
  - Quality Controlled
  - Designed and Standardized
  - Yet Continually Evolving



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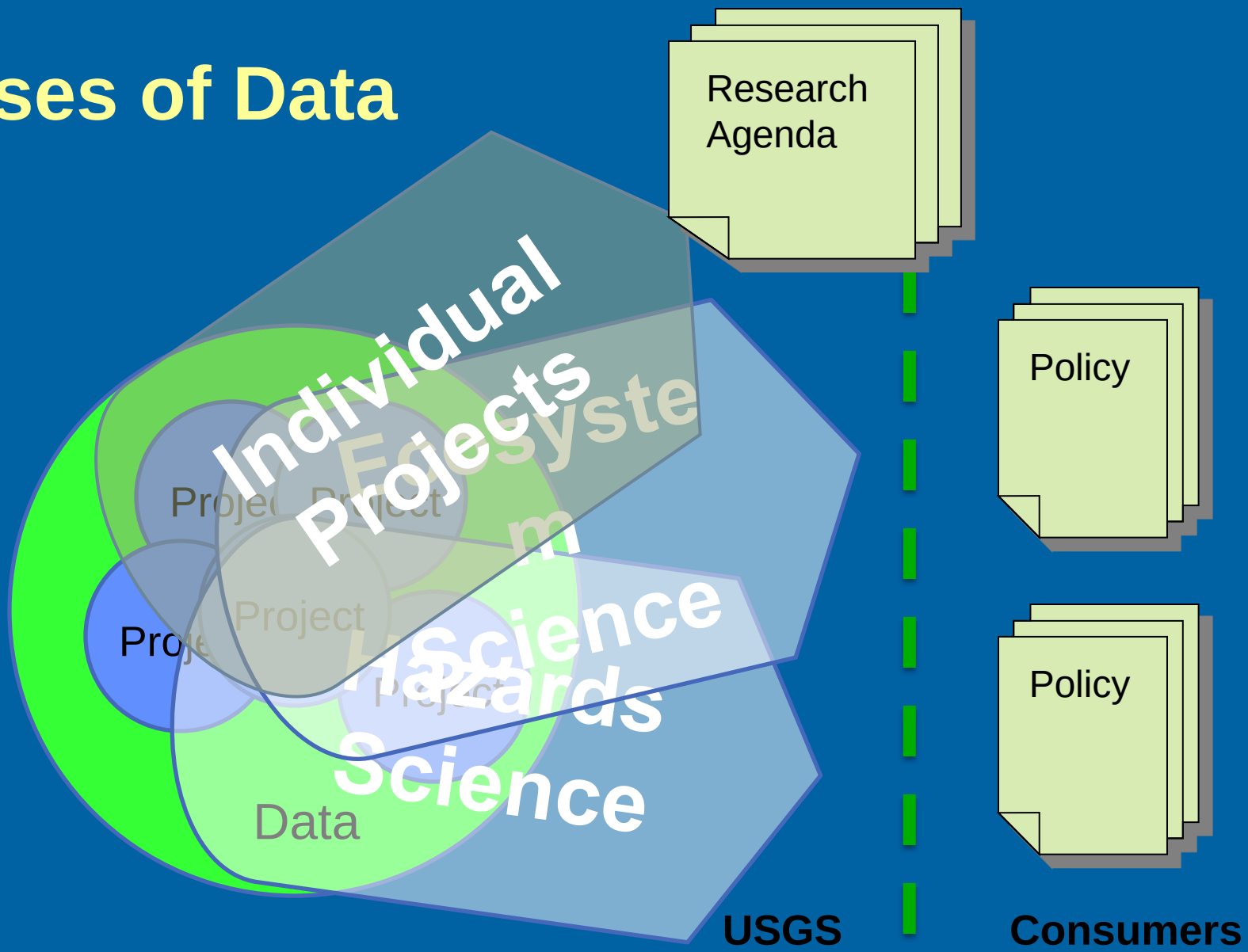
Uses of Data


Research Agenda
Individual Projects
Ecosystem
Science
Hazards
Science
Data
Policy
Policy
USGS
Consumers

How Do You Get There?

- 2006 – Scientific Information Management Workshop
- 2007 – A Data Integration and Interoperability Blueprint for the U.S. Geological Survey
  - Strategic Actions and Defined Projects
- 2009 – Initiated Community of Practice – “The Community for Data Integration”

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The CDI Story

- Chartered in 2009
- Responsibilities:
  1. Lead development and implementation of the USGS data integration strategy
  2. Provide recommendations for implementation of data integration guidelines
  3. Promote USGS-wide data integration
- 60 Members Join (Operational Practitioners)
- Community of Practice: Open to All
- Subcommittees: Address technical issues

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Community for Data Integration Vision Principles:

- Focus on targeted efforts that yield short-term benefits to science (solve an existing problem)
- Leverage existing capabilities (bottom up)
- Develop solutions or methodology that can be shared, replicated or repeated as well as scaled (in size and across programs)
- Provide solutions that can be sustained
- Seek substantial return on investment
- Expose corporate data
- Organize science models and outputs
- Preserve and access project data

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Community Project Strategy

- Provide “seed” funding to complete short-term, targeted efforts that benefit USGS Science Data Integration

- Deliverables will embrace the priorities identified by the CDI community to provide
  - Services (Mostly Computer Services & Tools)
  - Capacity (Skills and Training)
  - Consistent Framework (Solutions Architecture, Policy and Standards)

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Data Integration Project Deliverables

- ArcGIS Access to Corporate Databases
  - NWIS Web Services Snapshot Tool for ArcGIS
  - Mineral Resources WMS and WFS Services
- A Framework for Loosely Coupling Models
  - GeoData Portal
  - SERAP Data Portal
- Data Upload, Registry, and Access Tools
  - ScienceBase Data Uploader, Repository, and Catalog
- Working Groups & Training
  - Technology “Stack”, Meta Data, etc.
- Partnerships & Standards
  - GIN, NEON, NSF Earthcube, ESIP, NGC, etc.

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The Community for Data Integration Today:
Driving the Agenda, Defining Scope, Priority, and Tasks

- Open to All, Chartered with over 150 members
- Sharing our Stories Once A Month
- Developing A Long-Term Vision
- Identifying and Prioritizing Projects that can be Delivered in the Short-term
- Leveraging Best Practices
- Standing Up Working Groups
- Evolving solutions through Pilot Development & Testing
- 2011 Workshop theme of “Strengthening Partnerships,” with colleagues from ESIP, NSF, DataONE, GIN, Fed & State Agencies, Academia and Industry

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USGS Data and Information Resources

Digital Data

- BASIS+
- Publishing
- National Map
- ANSS
- NBII
- NWIS

application / database / web service

DATA.USGS.GOV

application / database / web service

application / database / web service

- Visualization
- Models
- Web site
- Downloadable Files
- Science Team Server
- Project Data

Physical Data

- Printed Pubs
- Paper Maps
- Analog Data
- Specimens
- Ice Core Lab
- Core Samples

Index

web service

External Data Sources

application / database / web service

- NOAA,
- DOI Bureaus
- University
- State/Local
- International
- NEON, GIN

Science Web Services Bus (connected globally)

Services and Metadata Registries

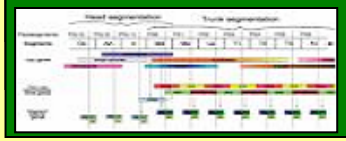
Data Models

- Hazards
- Ecosystems
- Energy
- Terrestrial Climate

Discovery & Access Portals

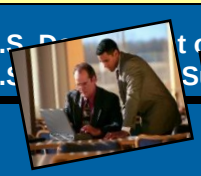
Quantitative Scientific Models

- Visualization Tools
- Individual Models
- Modeling Frameworks
- CO-LAB Interfaces



Informatics Applications

- GIScience
- Hydroinformantics
- Bioinformatics
- Geoinformatics



Internal & External User Communities

Thank You.

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